

5.12 Hydrology/Water Quality

Information contained in this section is summarized from the following hydrology and water quality technical reports:

- Storm Water Management Plan for Dos Colinas, Hunsaker & Associates, March 26, 2010.
- Drainage Study for Dos Colinas, Hunsaker & Associates, March 26, 2010.
- Agua Hedionda Creek Hydraulic Analyses for Dos Colinas, Lyle Engineering, Inc., May 2010.
- Hydromodification Study for Dos Colinas, Hunsaker & Associates, March 26, 2010.

These documents are provided as Appendices J1 through J4 on the attached CD of Technical Appendices found on the back cover of this EIR.

5.12.1 Existing Conditions

5.12.1.1 *Hydrologic Setting*

A. Regional Hydrologic Setting

The proposed project site is located within the San Diego Hydrologic Region. The San Diego Hydrologic Region is comprised of eleven smaller hydrologic units. The project site is located within the Carlsbad Hydrologic Unit. The entire Carlsbad Hydrologic Unit is a triangular area of approximately 210 square miles (134,400 acres), extending from Lake Wohlford east of Escondido, west of the Pacific Ocean, and from Vista on the north to Cardiff by the Sea on the south. The Carlsbad Hydrologic Unit contains four major coastal lagoons: Buena Vista, Agua Hedionda, Batiquitos, and San Elijo.

The project site is located in the Agua Hedionda Creek watershed. Agua Hedionda Creek is part of the Agua Hedionda Hydrologic Area, and the Los Monos Hydrologic Subarea (basin number 904.31). The Agua Hedionda Creek is the principal drainage course of the approximately 24 square mile Agua Hedionda watershed. The Agua Hedionda Creek originates in the hills south of the San Marcos Mountains and flows in a general southwest direction to where it ultimately discharges at the Agua Hedionda Lagoon. The Agua Hedionda Lagoon connects to the Pacific Ocean, and is considered Coastal Waters by the Regional Water Quality Control Board (RWQCB).

B. Project Site Hydrologic Setting

Drainage Areas

Figure 5.12-1 depicts the existing hydrology patterns of the project site. There are currently five points of discharge onsite (four at the CCRC site and one at the affordable housing site). Runoff from the CCRC site currently drains generally westerly and southerly to Agua Hedionda Creek. The affordable housing site runoff flows north and also discharges to Agua Hedionda Creek.

#1. North Discharge- A small portion of the northern hill drains northwesterly to an existing paved road and finds its way to the low point where it discharges into a channel north of Rancho Carlsbad Estates. This channel conveys runoff from an existing RV storage facility located northeast of the site. This area was identified in the City of Carlsbad's Drainage Master Plan as the location for proposed drainage Basin BJ (location approved pursuant to the Calavera Hills Master Plan Phase II, Bridge and Thoroughfare District No. 4 & Detention Basins (EIR 98-02, SCH No. 99111082).

#2. West Discharge- This is the largest drainage area and includes a large off-site tributary within the approved Cantarini Ranch subdivision. The runoff enters the property at two locations and flows westerly between the hills. Most of the project site contributes to this arroyo which collects runoff from both hills and conveys to a discharge point into the Rancho Carlsbad golf course near the southwest corner of the property. West of the northern hill, a low lying area is subject to inundation due to the construction of a berm east of the Rancho Carlsbad Estates by the Army Corps of Engineers to protect the adjacent Rancho Carlsbad Estates from flooding. Drainage from this area escapes across a dirt road and travels south to Agua Hedionda Creek.

#3. Central Discharge- A small portion in the center of the site discharges runoff from the southern hill into the golf course at its northeast corner.

#4. South Discharge- The south hill includes a saddle with a drainage course on the south side that collects most of the runoff and routes it to the creek at the south. Small portions of this hill avoid that drainage course and drain westerly into the Rancho Carlsbad golf course or southerly into the creek via sheet flow.

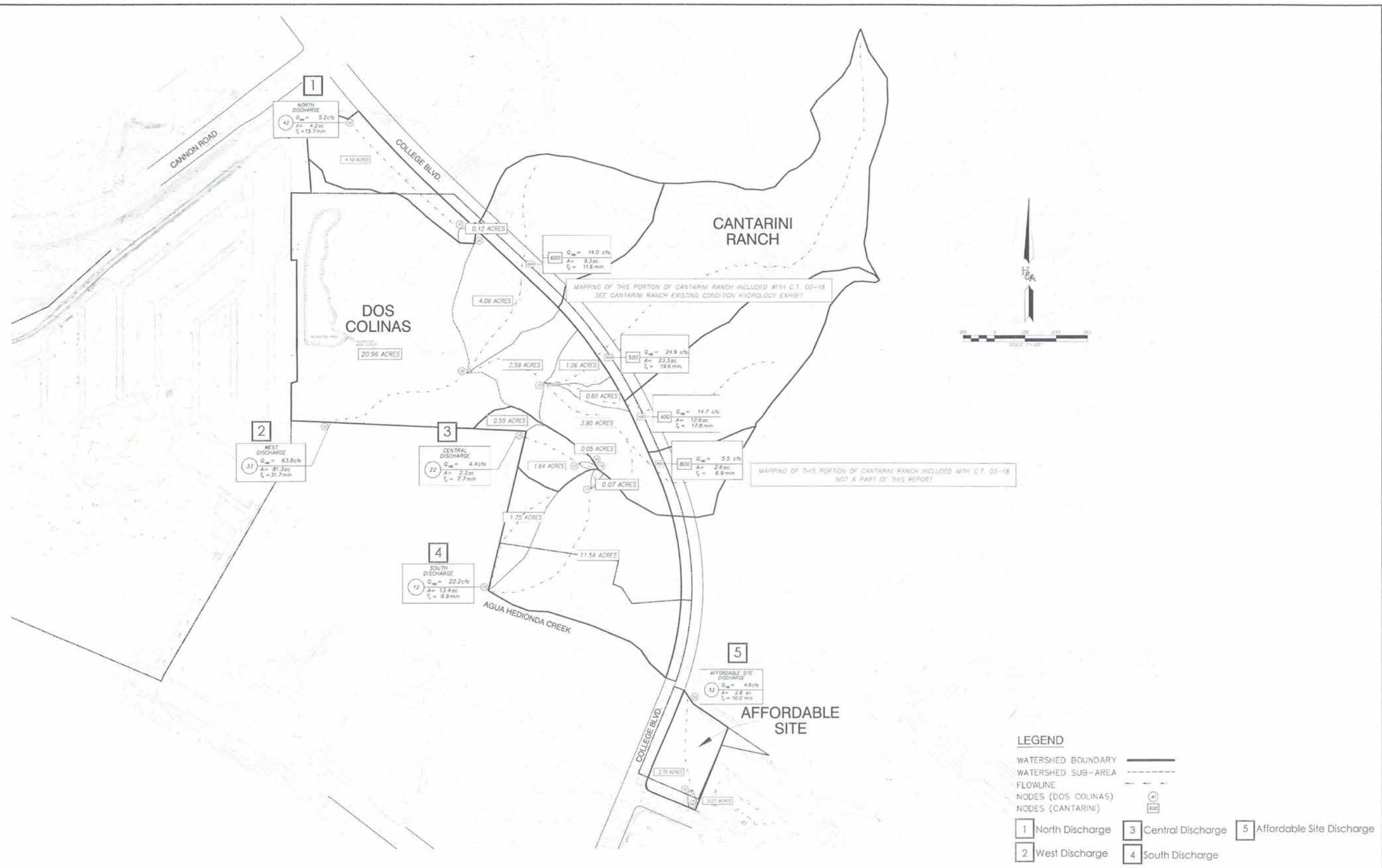
#5. Affordable- This is the area south of the creek, which drains northerly and discharges directly into the Creek.

The northwestern portion of the CCRC site (including the majority of the RV storage and garden area and the western detention basins), the southern portion of the CCRC site, and the entire affordable housing site are located within the 100-year floodplain, as shown on the FEMA FIRM maps. Table 5.12-1 depicts the existing 100-year storm event flow rates for the discharge areas onsite.

TABLE 5.12-1
Existing 100-Year Storm Event Flow Rate

Discharge Name	Acreage	Cubic Feet/Second
#1 North	4.2	5.2
#2 West	81.3	63.8
#3 Central	2.2	4.4
#4 South	13.4	22.2
#5 Affordable	2.8	4.6
TOTAL:	93.4	105.4

Notes: 1- Excludes area for Basin BJ.
Source: Hunsaker & Associates, 2010.



SOURCE: Hunsaker & Associates, Inc., 2010

7/7/10

Dos Colinas EIR
 Existing Condition Hydrology Map

FIGURE
 5.12-1



5.12.1.2 Hydromodification Analysis

Although the Dos Colinas project is not currently subject to hydromodification requirements, it is anticipated that when grading permits are processed for this project, it will be required. The applicant has therefore prepared a hydromodification analysis focused on the points of discharge and the potential erosion that development could cause downstream of those points. This study is based on criteria from the final Hydromodification Management Plan prepared for the County of San Diego by Brown and Caldwell, which is still pending final approval by the RWQCB. The hydromodification analysis analyzed four discharge points in detail. Figure 5.12-2 depicts these discharge points in the pre-developed condition. The discharge points analyzed for purposes of the hydromodification analysis are:

- Affordable Site (Affordable Discharge Point)
- South Basin (South Discharge Point)
- Central Basin (Central Discharge Point)
- Large Water Quality and Hydromodification Pond System (West Discharge Point)

The North Discharge Point was not analyzed because there is no anticipated adverse impact. There will be a reduction in the total impervious areas and post-development contributing area to the North Discharge Point is much smaller than the existing contributing area. Therefore, there is not a foreseeable precipitation scenario that can produce a larger runoff at that point in post-development conditions.

Table 5.12-2 depicts the characteristics of the contributing areas to each point in existing conditions. Note that the addition of the contributing area to all discharge points is not equal to the property area. The five discharge points were selected because they represent the concentrated points of discharge of all areas in the proposed Dos Colinas development. However, the West Discharge Point includes some areas from College Boulevard and Cantarini Ranch development to the east.

TABLE 5.12-2
Contributing Area Characteristics to Discharge Points in Pre-Development (Existing) Conditions

Discharge Point	Total Drainage Area (acres)	Impervious Areas (acres)	Pervious Areas¹ (acres)
Affordable	2.77	0.00	2.77
South	2.32	0.00	2.32
Central	1.45	0.00	1.45
West	90.11	0.00	90.11
North	9.07	1.01	8.06

Note: 1- Partition of pervious areas into different categories required by the SDHM program is shown in Appendix 3 of Hydromodification Study.

Source: Hunsaker & Associates, 2010.

5.12.1.3 *Flooding*

Portions of the CCRC site and the entire affordable housing site are located within the existing 100-year floodplain. Figure 5.12-3 depicts the existing floodplain for the project area. According to the FEMA FIRM maps, the City of Carlsbad, and the hydrological reports that have been prepared within the Agua Hedionda Watershed, there is a history of flooding at the Rancho Carlsbad Estates (RCE) that is adjacent to and west of the project site. Flooding is associated with the 100-year storm flows from Agua Hedionda Creek. Hydraulic analyses were prepared to support proposed grading improvements for the CCRC development and RV storage and garden area proposed on the west side of future College Boulevard, north of Sunny Creek Road and south of Cannon Road. This floodplain analyses were performed to assess potential impacts to the 100-year floodplain and floodway limits for Agua Hedionda Creek resulting from proposed grading improvements. The Rick Engineering report entitled "Rancho Carlsbad Mobile Home Park Alternative Analysis for Agua Hedionda Channel Maintenance" dated December 13, 2004 was used to perform updated hydrologic analyses. This report includes a hydrologic model (HEC-1) of the Agua Hedionda Creek watershed that incorporated the detention affects of the Melrose Basin, Faraday Basin, Basin BJB and Basin BJ. Lyle Engineering, Inc. modified this model to include only those basins that are currently constructed (i.e., Basin BJ is not included). This latest analysis shows that the total existing 100-year flow from the Agua Hedionda Creek downstream of Cannon Road is approximately 8,642 cubic feet per second.

In the existing condition, there is a large backwater area immediately upstream of Rancho Carlsbad Drive along the right overbank. Hydraulic depths in this area are less than one foot and velocities are less than two feet per second (fps) during a 100-year event. This area is currently designated as a Zone AE on the effective FEMA FIRM maps. However, based on FEMA Guidelines, this area should be designated as a shaded Zone X, which is considered as an area of 100-year flooding with average depths of less than one foot. These areas are identified in the community Flood Insurance Study as areas of moderate or minimal hazard from the principal source of flood in the area.

5.12.1.4 *Water Quality*

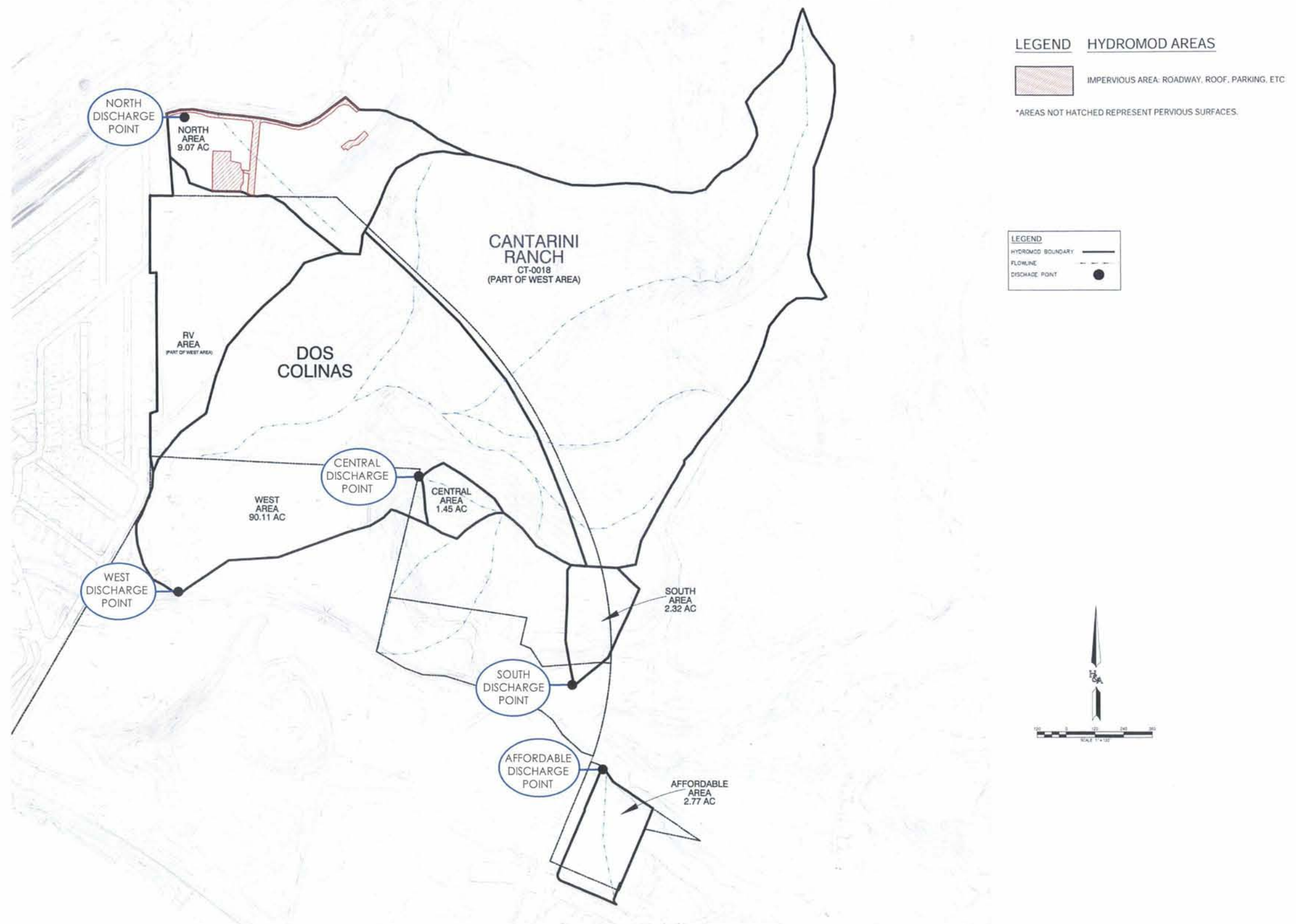
A. San Diego Regional Water Quality Control Board Basin Plan

Each of the nine regional boards in California is required to adopt a Basin Plan. Basin Plans designate the beneficial uses for all surface and groundwater in the San Diego Region.

B. Beneficial Uses

Beneficial uses of surface water and groundwater have been established for each water body within the San Diego Basin. According to the RWQCB Basin Plan:

Beneficial uses are defined as the uses of water necessary for the survival or well being of man, plants and wildlife. The uses of water serve to promote the tangible and intangible economic, social and environmental goals of mankind.



SOURCE: Hunsaker & Associates, Inc., 2010

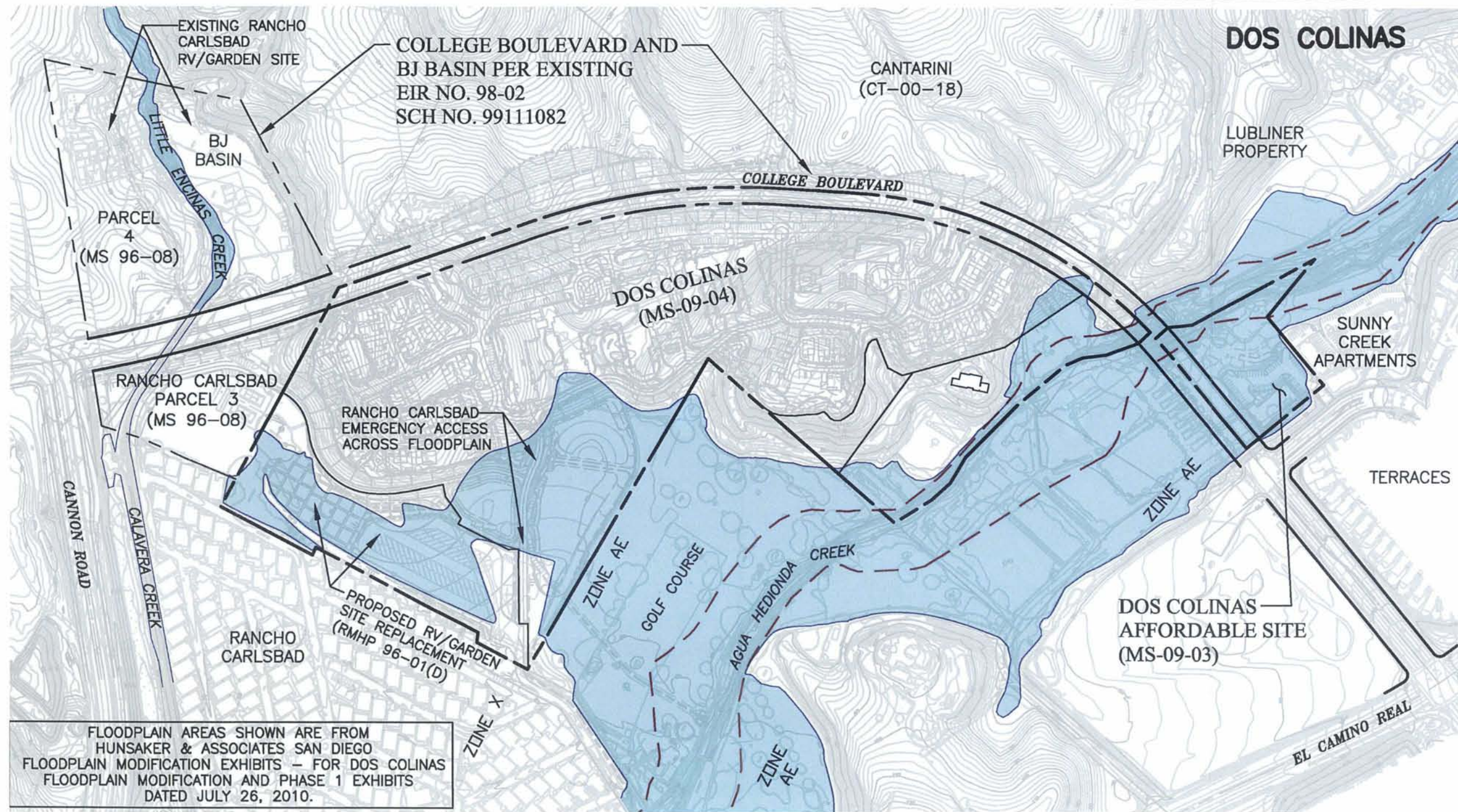
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Dos Colinas EIR

Pre-Developed (Existing) Condition Hydromod Map

FIGURE
5.12-2



SOURCE: Ladwig Design Group, Inc., 2010

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Dos Colinas EIR
Existing Floodplain

FIGURE
5.12-3

Examples include the drinking, swimming, industrial, and agricultural water supply, and the support of fresh and saline aquatic habitats. According to the Basin Plan, beneficial uses have been designated for specific coastal water bodies, inland surface waters, and groundwater.

In 1972, the State Water Quality Control Board (SWQCB) adopted a uniform list and description of beneficial uses to be applied throughout all hydrological basins of the State. Water bodies that have beneficial uses that may be affected by construction activity and post-construction activity include Agua Hedionda Creek (Los Monos Hydrologic Subarea) and Agua Hedionda Lagoon. Table 5.12-3 identifies the designated beneficial uses for Agua Hedionda Creek and Lagoon.

In terms of groundwater, the majority of the Los Monos Hydrologic Subarea groundwater area is located just south of the project site; however, the project site may be considered tributary to the Los Monos Hydrologic Subarea groundwater area. Table 5.12-3 identifies the beneficial uses associated with the Los Monos Hydrologic Subarea groundwater area. The beneficial uses are applicable to the portion of the Los Monos Hydrologic Subarea groundwater area tributary to Agua Hedionda Creek downstream from the El Camino Real crossing. In addition, the beneficial uses are applicable to the land area east of Interstate 5, east of the easterly boundary of El Camino Real, north of the southerly edge of Agua Hedionda Lagoon and east of the easterly portion of El Camino Real along the ridge-lines separating Letterbox Canyon and the area draining to the Marcario Canyon.

TABLE 5.12-3
Beneficial Uses of Project Effected Surface Water and Groundwater

Beneficial Uses	Agua Hedionda Lagoon	Agua Hedionda Creek	Los Monos Hydrologic Subarea (Groundwater)
MUN		•	•
AGR		•	•
IND	•	•	•
REC-1	•	•	
REC-2	•	•	
COMM	•		
BIOL	•	•	
EST	•		
WARM		•	
WILD	•	•	
RARE	•		
MAR	•		
AQUA	•		
MIGR	•		
SPWN	•		
SHELL	•		

Source: Regional Water Quality Control Board, Basin Plan, May 5, 1998.

The following are definitions of the applicable beneficial uses.

Municipal and Domestic Supply (MUN) – Includes uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

Agricultural Supply (AGR) – Includes uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

Industrial Service Supply (IND) – Includes uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.

Contact Water Recreation (REC-1) – Includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, white water activities, fishing, or use of natural springs.

Non-contact Water Recreation (REC-2) – Includes the uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Commercial and Sport Fishing (COMM) – Includes the uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.

Preservation of Biological Habitats of Special Significance (BIOL) – Includes uses of water that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves, or Areas of Special Biological Significance, where the preservation or enhancement of natural resources requires special protection.

Aquaculture (AQUA) – Includes the uses of water for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, or harvesting of aquatic plants and animals for human consumption or bait purposes.

Warm Freshwater Habitat (WARM) – Includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Estuarine Habitat (EST) – Includes uses of water that support estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds).

Marine Habitat (MAR) – Includes uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).

Wildlife Habitat (WILD) – Includes uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Rare, Threatened, or Endangered Species (RARE) – Includes uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.

Migration of Aquatic Organisms (MIGR) – Includes uses of water that support habitats necessary for migration, acclimatization between fresh and salt water, or other temporary activities by aquatic organisms, such as anadromous fish.

Shellfish Harvesting (SHELL) – Includes uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters and mussels) for human consumption, commercial, or sport purposes.

Spawning, Reproduction, and/or Early Development (SPWN) – Includes uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters and mussels) for human consumption, commercial, or sport purposes.

C. Water Quality Objectives

Section 13241 of the California Water Code indicates that each Regional Water Quality Control Board is required to establish water quality objectives for the waters of the state (i.e., ground and surface waters) which, in the Regional Board's judgment, are necessary for the reasonable protection of beneficial uses and for the prevention of nuisance. Like the designation of beneficial uses, the designation of water quality objectives must satisfy all of the applicable requirements of the California Water Code, Division 7 (Porter-Cologne Act) and the Clean Water Act. The Clean Water Act Section 303 requires that the State adopt water quality objectives (called water quality criteria) for surface waters. The Water Quality Control Plan for the San Diego Basin identifies a wide range of water quality objectives.

D. Clean Water Act Section 303(d) List of Impaired Waterbodies

Section 303(d) of the federal Clean Water Act (CWA, 33 USC 1250, *et seq.*, at 1313(d)), requires states (Regional Water Quality Control Board) to identify waters that do not meet the water quality objectives that are designated to protect the beneficial uses of particular waterbodies after applying certain required technology-based effluent limits. Waters that do not meet the water quality standards are referred to as "impaired" water bodies. States are required to compile this information in a list and submit the list to the United States Environmental Protection Agency (USEPA) for review and approval. This list is known as the Section 303(d) List of Impaired Waterbodies. As part of the listing process, states are required to prioritize water/watersheds for future development of total maximum daily load (TMDL). The TMDL establishes the allowable pollutant loadings or other quantifiable parameters for a water body and provides the basis for the State to establish water quality based controls. The purpose of TMDLs is to ensure that beneficial uses of the water body are restored and that the water quality objectives are achieved.

On June 28, 2007, the USEPA gave final approval to California's 2006 Section 303(d) List of Water Quality Limited Segments. With respect to the proposed project site, Agua Hedionda Creek and Lagoon are

identified on the List of Water Quality Limited Segments. Stormwater runoff from the project site drains to Agua Hedionda Creek, which in turn, drains to Agua Hedionda Lagoon. Agua Hedionda Creek is identified as impaired by manganese, selenium, sulfates, and total dissolved solids. Total dissolved solids affect approximately seven miles of Agua Hedionda Creek. Agua Hedionda Lagoon is also identified as impaired due to bacteria indicators and sedimentation/siltation. Potential sources of these pollutants are non-point sources. Bacteria indicators and sedimentation/siltation affect approximately 6.8 acres of Agua Hedionda Lagoon. The RWQCB has determined that developing TMDLs for these contaminants is a lower priority for this watershed than in other watersheds.

E. Regulation/Legal Basis for Authority

The principal federal and state laws pertaining to the regulation of water quality are known respectively, as the 1972 Federal Water Pollution Control Act (also known as the Clean Water Act) and Division 7 of the 1969 California Water Code (also known as the Porter-Cologne Water Quality Control Act). These laws are similar in many ways. The fundamental purpose of both laws is to protect the beneficial uses of water. An important distinction between the two laws is that the Porter-Cologne Water Quality Control addresses both ground and surface waters while the Clean Water Act addresses surface water only. The RWQCB has developed policies, rules, and procedures, and has been granted the authority to implement and enforce the laws and regulations requiring the control of water quality.

The Clean Water Act (CWA) also established the National Pollutant Discharge Elimination System (NPDES), which requires permits for discharges of pollutants from certain point sources into waters of the United States. The CWA allows the EPA to delegate NPDES permitting authority to states with approved environmental regulatory programs. California is one of the delegated states. The NPDES permits relative to this project are the Regional General Municipal Stormwater Permit and the General Construction Stormwater Permit.

F. Regional General Municipal Stormwater Permit

The RWQCB has adopted an area-wide Municipal Stormwater Permit, Order No. R9-2007-0001, NPDES No. CAS0108758, "Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Stormwater Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities of San Diego County and the San Diego Unified Port District." Under this area-wide Municipal Stormwater Permit, municipalities are ultimately held responsible for everything in their stormwater conveyance systems, including industrial and construction stormwater runoff. Order No. R9-2007-0001 presents guideline requirements for the control of pollutants resulting from stormwater and urban runoff from all areas named in NPDES Permit No. CAS0108758. The RWQCB specifically requires Co-permittees to inventory existing stormwater pollution control programs, illicit discharge detection programs, monitor programs and data, stormwater conveyance system maps, land use maps, and existing laws, ordinances, and codes. The Co-permittee (discharger) has the authority to implement and enforce stormwater management programs in their areas of jurisdiction and where necessary, and to promulgate the authority to carry out all functions of the stormwater management programs.

The municipal stormwater permit requires Co-permittees to utilize planning procedures including a master plan to develop, implement, and enforce controls to reduce the discharge of pollutants from municipal separate storm sewers which receive discharges from areas of new development and significant redevelopment. This new permit addresses controls to reduce pollutants in discharges from municipal separate storm sewers after construction is completed. With respect to land use planning for new development and redevelopment, at a minimum, each Co-permittee shall assess its general plan, modify development project approval processes, revise environmental review processes, and conduct education efforts focused on new development and redevelopment to minimize the short and long-term impacts on receiving water quality.

To implement Municipal Stormwater Permit, Order No. R9-2007-0001, NPDES No. CAS0108758, the City of Carlsbad has adopted a Standard Urban Stormwater Management Plan (SUSMP) that describes the process and procedures projects must comply with to satisfy post-development runoff design and treatment requirements.

G. General Construction Stormwater Permit

Pursuant to Section 402(p)(4) of the CWA, EPA promulgated regulations for NPDES permit applications for stormwater discharges. On November 16, 1990, the EPA published final regulations establishing that stormwater to waters of the United States from construction projects that encompass one (1) or more acres of soil disturbance are effectively prohibited unless the discharge is in compliance with an NPDES Permit. State Water Resources Control Board (SWRCB) Order No. 2009-0009-DWQ, NPDES General Permit No. CAS000002, "General Permit for Stormwater Discharges Associated with Construction Activity," which became effective July 1, 2010, is the active general stormwater construction activity permit for the State of California and RWQCB.

In order to be in compliance with the Permit, the SWPPP prepared for this project must include the following:

- Notices of Intent (NOIs) – Certification to be signed by owner of the construction site.
- Stormwater Pollution Prevention Plans (SWPPPs) – The SWPPP shall be designed to address the following objectives: 1) All pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity are controlled; 2) Where not otherwise required to be under a Regional Water Board permit, all non-storm water discharges are identified and either eliminated, controlled, or treated; 3) Site Best Management Practices (BMPs) are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from construction activity to the Best Available Technology Economically Achievable (BAT)/Best Conventional Pollutant Control Technology (BCT) standard; 4) Calculations and design details as well as BMP controls for site run-on are complete and correct; and 5) Stabilization BMPs installed to reduce or eliminate pollutants after construction are completed.
- Monitoring Program and Reporting Requirements – Including inspection of prevention measures record keeping and annual certification of compliance, due July 1, 1993, and each July 1

thereafter. Dischargers of stormwater associated with construction activity that directly enters a water body listed on the 303 (d) list of impaired water bodies shall conduct a sampling and analysis program for the pollutants (sedimentation/siltation or turbidity) causing the impairment. Discharges that flow through tributaries that are not listed on the 303(d) list of impaired water bodies or that flow into Municipal Separate Storm Sewer Systems (MS4s) are not subject to these sampling and analysis requirements.

H. On-Site Wetlands

Southern sycamore-alder riparian woodland is the primary wetland feature within the project site and is located in between the CCRC site and affordable housing site. These wetlands occur in Agua Hedionda Creek. Approximately 0.6 acres of ACOE jurisdiction (inclusive of CDFG and Regional Water Quality Control Board) are associated with on-site southern sycamore-alder riparian woodland. 1.0 acre is under California Department of Fish & Game jurisdiction with adjacent riparian habitat. Figure 5.6-2 (see Section 5.6-Biological Resources) depicts the on-site wetlands. A more detailed discussion of wetlands is provided in Section 5.6.

5.12.2 Thresholds for Determining Significance

Appendix G of the CEQA Guidelines is used to provide direction for determination of a significant hydrology or water quality impact from the proposed project. For the purposes of this EIR, a significant impact would occur if the proposed project would:

- *Violate any water quality standards or waste discharge requirements;*
- *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;*
- *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;*
- *Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage system or provide substantial additional sources of polluted runoff;*
- *Cause or contribute to an exceedance of applicable surface or groundwater receiving water quality objectives or degradation of beneficial uses;*
- *Substantially impact aquatic, wetland or riparian habitat;*
- *Otherwise substantially degrade water quality;*
- *Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map; or,*
- *Place within a 100-year flood hazard area structures which would impede or redirect flood flows.*

5.12.3 Environmental Impact

5.12.3.1 *On-site or Off-site Erosion or Siltation*

Implementation of the proposed project would include the use of machinery and materials handling and storage (e.g., asphalt, gravel) during all phases of construction. These activities would require the use of graders and other earthmoving equipment during initial site preparation, which would generate dust and require the use of water trucks to meet fugitive dust requirements. The use of water trucks increases the potential for silt to exit the project site and enter the surrounding Agua Hedionda Creek watershed. Increased erosion may also occur from construction activities and the modification and/or filling and rerouting of existing drainage patterns. Therefore, the proposed project has the potential to result in significant adverse impacts related to erosion and siltation. Mitigation Measure WQ-1 will require the approval of an erosion control plan by the City Engineering Department prior to issuance of a grading permit for the project. Implementation of this mitigation measure will reduce the potential impacts from erosion and siltation to less-than-significant levels.

5.12.3.2 *Flooding and Stormwater Drainage System Capacity*

With development of the proposed project, land uses will result in a change in the topographical conditions of the area and an increase in impervious surface area. Because a majority of the project site is currently undeveloped, proposed development will create an increase in impervious area and there will be a corresponding level of increased stormwater runoff volumes.

Phase 1 Project Grading/Floodplain Modification

The project site is anticipated to be graded in two separate, but consecutive phases. The proposed RV storage and garden areas adjacent to the CCRC site have been designed to replace a similar existing facility located offsite, northeast of College Boulevard, on property owned by the Rancho Carlsbad Owners Association (APN #16805036 – see Figure 3-3 in Chapter 3.0 Project Description of this EIR). The existing off-site RV storage facility and garden area are required to be removed and relocated (i.e., recreational vehicle storage and garden plots, as a mitigation measure for the future extension of College Boulevard Reach "A" (EIR No. 98-02, SCH No. 99111082) and the Zone 15 Local Facilities Management Plan. In order to facilitate this relocation, a map would be recorded to allow the transfer of ownership of the new proposed RV storage and garden parcel to Rancho Carlsbad Estates prior to mapping the larger CCRC site development. The proposed RV storage/recreation area would then be developed so that Detention Basin "BJ" could be constructed.

Figure 5.12-4 depicts the Phase 1 floodplain modification condition. Tables 5.12-4 and 5.12-5 summarize the floodplain volume for the Phase 1 grading. As shown, in the Phase 1 condition, there would be a net loss of 2.52 acres of floodplain area; however there would be no net loss or gain of storage volume as more storage volume would be created by excavating portions of the CCRC site proposed for the detention basins. Also, the net loss in floodplain area during Phase 1 will be compensated for with the construction of detention Basin "BJ" after the relocation of the existing RV storage/recreation area is complete.

EXISTING & PROPOSED
100 YEAR FLOODPLAIN
PER LYLE ENG.
HYDRAULIC ANALYSIS
DATED MARCH 2010

PHASE 1
BORROW SITE
(FOR RV LOT)
18,300 C.Y.

PROPOSED 100 YEAR
FLOODPLAIN PER LYLE
ENG. HYDRAULIC ANALYSIS
DATED MARCH 2010

RCMHP EMERGENCY ACCESS
TO BE INSTALLED WITH
PHASING UNIT 2

PROPOSED GRADING
DAYLIGHT LINE (LIMITS
OF GRADING)

INDARY
LINE

PROPOSED PHASE 1
GRADING DAYLIGHT LINE
(LIMITS OF GRADING)

0.13 AC LIMITED BORROW AREA
CUT LIMITED TO 2,600
C.Y. FOR PHASE 1 FILL
MAXIMUM DEPTH = 1'

FLOODPLAIN MODIFICATION ANALYSIS

VOLUME SUMMARY

	Proposed Storage Volume Gain (Cu.Ft.)	Existing Storage Volume Loss (Cu.Ft.)	Storage Volume Net Gain (Cu.Ft.)
PHASE 1	70,200 CF	70,200 CF	0 CF

Phase 1 Site

	Existing Floodplain Area Total	Area Gain (Loss)	Area (Loss)	Modification Graded to Increase Capacity	No Modification No Grading Proposed	Proposed Floodplain Area Total	Net Gain/ (Loss)
Grand Total	12.58	0.39	(4.25)	9.87	5.02	14.89	1.14
Phase 1	4.22	0.14	(2.04)	1.7	0	1.70	(2.92)*
Phase 1 Remainder	8.33	0.25	(1.99)	7.87	5.02	12.99	3.66

*NOTE: LOSS IN FLOOD PLAIN AREA DURING PHASE 1 WILL BE MITIGATED
COMMENSURATE WITH THE CONSTRUCTION OF BJ BASIN AFTER THE RELOCATION.

FLOODPLAIN LEGEND

- FLOODPLAIN MODIFICATION AREA
(PROPOSED STORAGE VOLUME GAIN WITHIN EXISTING 100-YR FLOODPLAIN)
- FLOODPLAIN MODIFICATION AREA
(PROPOSED STORAGE VOLUME GAIN OUTSIDE EXISTING 100-YR FLOODPLAIN)
- FLOODPLAIN MODIFICATION AREA
(PROPOSED STORAGE VOLUME LOSS WITHIN EXISTING 100-YR FLOODPLAIN)

- CHANNEL FLOWLINE
- 100-YR FLOODPLAIN LINE EXISTING (LYLE)
- 100-YR FLOODPLAIN LINE PROPOSED (LYLE)
- FLOODWAY LINE EXISTING (LYLE)
- FLOODWAY LINE PROPOSED (LYLE)

- EXISTING SPOT ELEVATION
- PROPOSED STORAGE VOLUME DEPTH (GAIN OR LOSS)
- PROPOSED & EXISTING AGUA HEDIONDA CREEK STATION
POINT & WATER SURFACE ELEVATION (LYLE)



SOURCE: Ladwig Design Group, Inc., 2010

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Phase 1 Floodplain Modification

FIGURE
5.12-4

TABLE 5.12-4
Phase 1 – Floodplain Storage Volume Modification Summary

Volume Summary			
	Proposed Storage Volume Gain (Cu. Ft.)	Existing Storage Volume Loss (Cu. Ft.)	Storage Volume Net Gain (Cu. Ft.)
Phase 1	70,200 CF	70,200 CF	0 CF

Source: Hunsaker & Associates, 2010

TABLE 5.12-5
Phase 1 – Floodplain Area Modification Summary

	Existing Floodplain Area Total	Area Gain	Area (Loss)	Modification Graded Increase Capacity	No Modification No Grading Proposed	Proposed Floodplain Area Total	
Grand Total	13.55	5.39	(4.25)	9.67	5.02	14.69	1.14
Phase 1	4.22	0.14	(2.66)	1.7	0	1.70	(2.52)*
Phase 2 Remainder	9.33	5.25	(1.59)	7.97	5.02	12.99	3.66

Note: The net loss in floodplain area during Phase 1 will be compensated for with the construction of detention Basin "BJ" after the relocation of the existing RV storage/recreation area is complete.

Source: Hunsaker & Associates, 2010

Phase 2/Completed Project Grading/Floodplain Modification

Table 5.12-6 depicts this increase in stormwater runoff volumes with completion of all project phases of development. Figure 5.12-5 depicts the post-development conditions. A drainage study was performed to evaluate the increase in runoff that will be generated by development of the proposed project, and improvements have been identified to accommodate the runoff volumes. Runoff from the developed project site drains to the same five points of discharge as in pre-development conditions.

TABLE 5.12-6
Comparison of Existing and Proposed Project Hydrology
100-Year Storm Event Flow Rate

Discharge Name	Existing Conditions		Developed Conditions	
	Drainage Area (acres)	100-Year Peak Flow (cfs)	Drainage Area (acres)	100-Year Peak Flow (cfs)²
#1 North ¹	4.2	5.2	4.7	9.4
#2 West	70.8	69.0	75.2	148.1
#3 Central	2.2	4.4	2.3	5.7
South	13.4	22.2	11.7	21.6
Affordable	2.8	4.6	2.3	7.1
College Storm	N/A	N/A	0.5	1.8
TOTAL	93.4	105.4	96.7	193.7

Notes: 1 Excludes area for Basin BJ, calculations for which are not within the scope of the report

2 Peak flows do not include the effect of attenuation expected from hydromodification basins.

Source: Hunsaker & Associates, 2010.

In order to access the project site, College Boulevard will need to be extended between Sunny Creek Road and Cannon Road. This facility is identified in the Zone 15 Local Facilities Management Plan (LFMP) and construction is required from the first property developed within Zone 15. Runoff from College Boulevard is collected in storm drain systems at points established with CT 00-18, the central portion of which is conveyed through this project. The most northern and southern portions of College will include storm drain improvements as may be approved with drawing 456-3E for Improvements to College Boulevard currently in plan check with the City.

South Area

The south area preserves the existing arroyo due to habitat impacts. Drainage within the development area is routed to a water quality/hydromodification basin prior to discharge into the creek. The developed model includes undeveloped area within the project to the south and west so as to provide a comparison of existing and proposed runoff for the site using equal project area.

Central Area

The central area includes a small development pocket of detached living units. A separate water quality and hydromodification basin is provided at the outlet point prior to discharge onto the Rancho Carlsbad golf course.

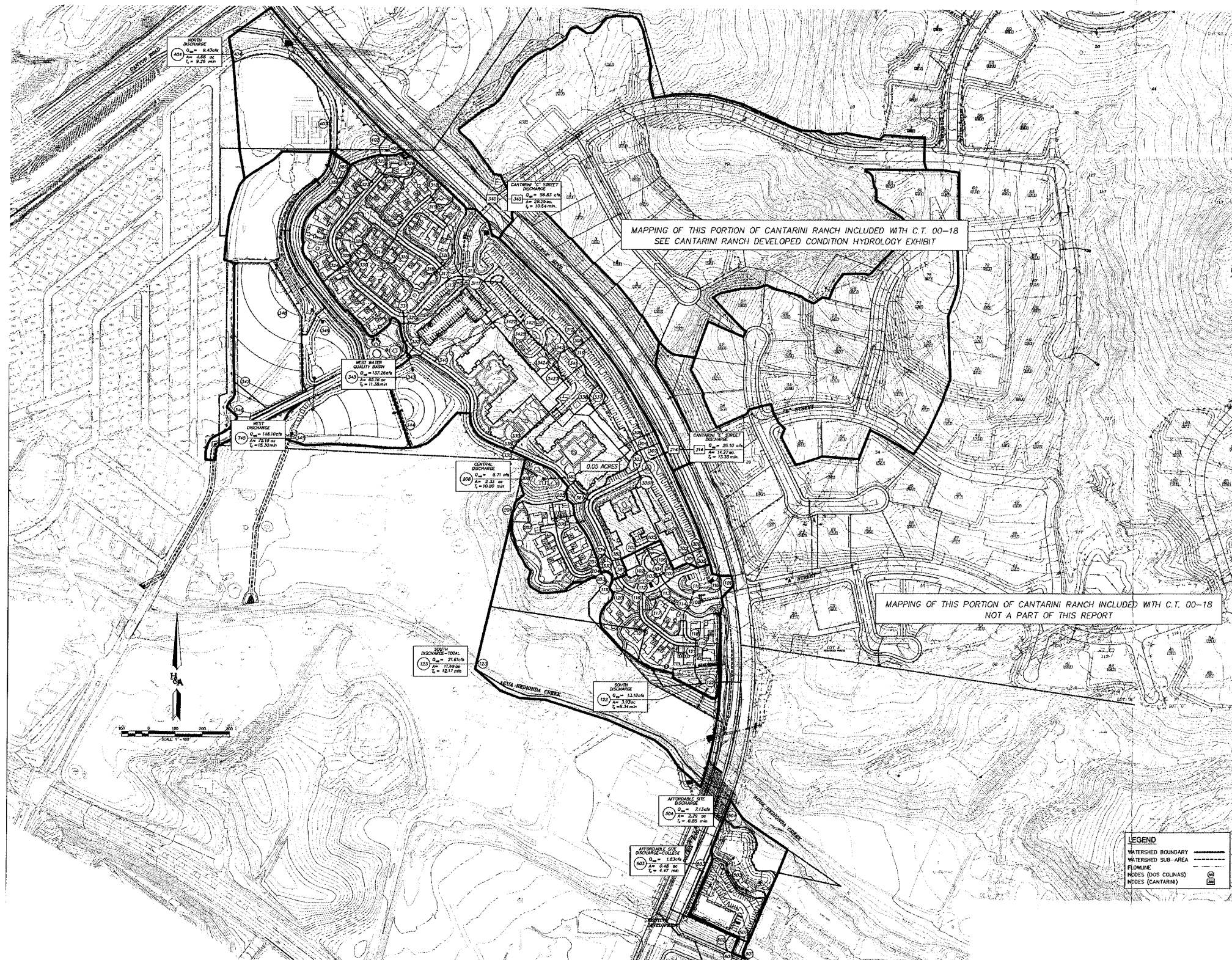
West Area

The west area includes the largest developed area onsite. Site design in this area collects off-site runoff from Cantarini Ranch from two locations:

- Street "C" and College Boulevard
- Street "E" in the center of the site

Drainage will be conveyed through the site within the private driveways and routed through the proposed West water quality basin for treatment prior to discharging through the West hydromodification basin and to Agua Hedionda Creek through a reinforced concrete pipe to be installed across the Rancho Carlsbad golf course. This system serves as the drainage backbone for collecting on-site storm drain system. Site design includes an RV storage and demonstration garden for Rancho Carlsbad Estates, which will replace current facilities located in the proposed Basin BJ area.

The tentative map depicts grading to route storm flows on Cantarini to the proposed Private Driveway "A" intersection with College Boulevard using a concrete lined ditch. Sizing for this temporary channel is included in Chapter 5 of Appendix J2. This grading is included to match the developed drainage patterns proposed on Cantarini so that the storm drain system can be sized appropriately for the developed flows reported in the Cantarini Ranch drainage report (nearly 57 cfs.) and not introduce additional temporary drainage undercrossing of College Boulevard that would otherwise be needed.



SOURCE: Hunsaker & Associates, Inc., 2010

9/13/10



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Developed Condition Hydrology Map

FIGURE
5.12-5

A second storm drain branch is shown collecting runoff from a more southerly existing natural arroyo on the Cantarini property, and is sized to collect the peak runoff from the Cantarini Development, at this location in the center of the project.

Site design includes a hydromodification basin and a water quality basin within the property to mitigate hydromodification impacts and provide water quality treatment for drainage from Cantarini and College Boulevard.

North Area

The size of the on-site tributary area that is located within the north area of the project site will be reduced to consist only of development and slope, a sewer access road, and 12 parking spaces, which would be located above the low lying undisturbed portion. Five of these parking spaces will be paved and seven will be constructed of decomposed granite. The developed model includes undeveloped area between the project and the existing channel to the north, but excludes an analysis of the channel, as the project does not impact this channel.

This channel will convey drainage from Basin "BJ", a facility required by the Zone 15 LFMP. As with College Boulevard, should this property proceed to construction prior to development of that project, the project would be required to construct Basin "BJ".

Affordable Area

The affordable housing site is located entirely within the existing floodplain and approximately 10 feet of fill is proposed to raise the elevation of the building pad above the flood plain. The filling does not include existing open space area located south of the property and north of Sunny Creek Road, owned by others. A storm drain system is extended to pick up runoff in this area and convey it to the system located within College Boulevard. Drainage from the developed portion of the project site will be routed to the Affordable basin, designed to mitigate hydromodification impacts prior to discharge into the creek.

Conclusion

Discharge from the detention basins is directly into Agua Hedionda Creek or areas of the 100-year flood plain. Final storm drain routing, sizing, inlet and rip rap design details will be provided at the final engineering stage of the development. To facilitate the evaluation of the impacts, preliminary sizing is included for the rip rap at the west basin outfall into the creek, as well as the channel south of College Boulevard on the Cantarini Property, and spillway sizing.

As shown in Table 5.12-6, the proposed project would result in a greater volume of runoff from the site than under existing conditions. Five detention basins are being proposed to handle the increase in runoff generated by development of the proposed project. The storm drain systems will be designed to convey stormwater runoff to the detention basins, which will then drain to the same five points of discharge as in pre-development conditions. Therefore, the proposed project would not result in increased flooding onsite or offsite and impacts related to flooding would be less than significant.

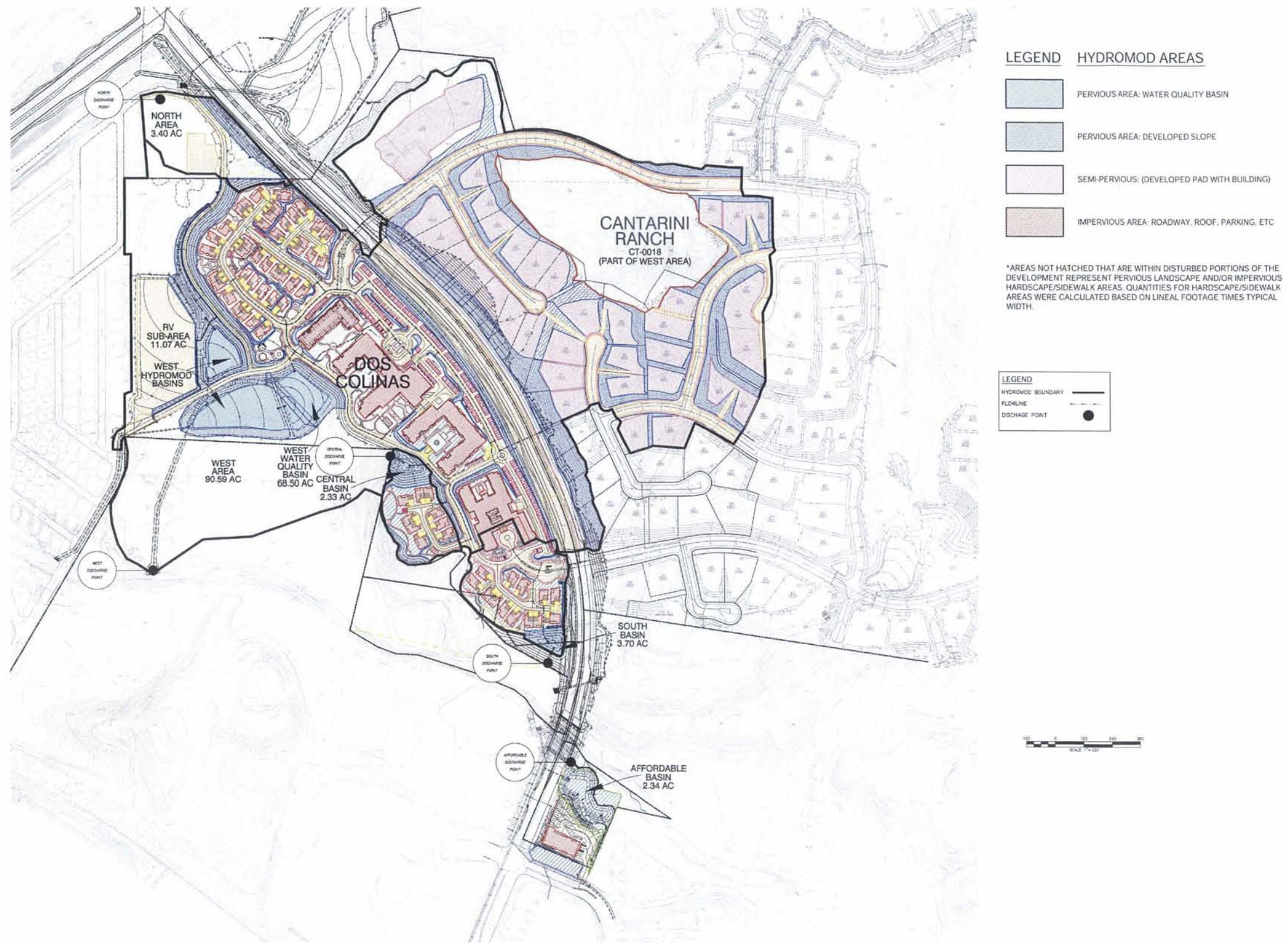
5.12.3.3 Hydromodification Analysis

The discharge points in post-development conditions are the same that are in pre-development conditions, but the contributing area size and characteristics will change as a result of the development. Because a majority of the project site is currently undeveloped, the proposed project will result in an increase in impervious areas over existing conditions, increasing stormwater runoff volumes and altering the route and velocity in which water flows across the project site. Changes in stormwater runoff can lead to increased erosion and sedimentation rates of downstream channels, creeks and rivers, causing increased turbidity, channel aggradation, or channel degradation. Figure 5.12-5 depicts the post-development conditions. The Affordable Discharge Point is now the discharge point of a hydromodification/water quality basin that received drainage from the affordable site. The Central Discharge Point and the South Discharge Point correspond to the discharge area of the Central Basin and the South Basin (both are Water Quality/Hydromodification basins). The Western Discharge Point corresponds to the discharge of the outlet pipe from the West Basin System plus additional contributing areas from existing terrain and discharge of the Central Basin. The North Discharge Point contributing area comprises a small portion of undeveloped or landscaped slope areas draining to the north inside the property boundary and existing tennis court and modified access road plus pervious areas around the tennis court.

The West Basin System will be composed of three separate ponding areas. The first area (the most upstream) corresponds to the water quality volume of a significant portion of Dos Colinas plus some areas of College Boulevard and Cantarini Ranch development to the east; this ponding area is called the West Water Quality Basin. The discharge of the West Water Quality Basin will travel to the downstream hydromodification basin where the water will initially be detained and then discharged to the West Discharge Point. An additional ponding area is located north of the first ponding area. The third ponding area is located on the other side of the emergency driveway access. The second and third ponding areas will receive runoff from the proposed RV area and landscaped areas surrounding it and it is hydraulically connected by a large pipe to the downstream portion of the large pond. Therefore, the two connected ponds will act hydraulically as a single basin called the West Hydromodification Basin. Together, the West Water Quality Basin and West Hydromodification Basin form the West Basin System. Table 5.12-7 depicts contributing area characteristics to analyzed discharge points in post-development conditions.

The West Basin System (consisting of the West Water Quality Basin and West Hydromodification Basin) reduces the peak flow in the discharge range to values compatible with hydromodification requirements. Figure 5.12-6 depicts the developed condition of the proposed project and hydromodification areas. The discharge of this basin moves downstream to the hydromodification basin where the water is detained before being discharged to the West Discharge Point. When the discharge of the West Basin System discharge is combined with the additional runoff (from the Central Drainage Point and from the Additional Contributing area between the Central Discharge Point and the West Discharge Point), the resulting flow duration curve is still below the pre-development flow duration curve. Therefore, hydromodification criteria are met in all studied points.

The Affordable Discharge Point would become the drainage point of a hydromodification/water quality basin receiving drainage from the Affordable Site.



SOURCE: Hunsaker & Associates, Inc., 2010

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Dos Colinas EIR

Developed Condition Hydromod Map

FIGURE
5.12-6

TABLE 5.12-7
Contributing Area Characteristics to Discharge Points in Post-Development Conditions

Discharge Point	Total Drainage Area (acres)	Impervious Areas¹ (acres)	Pervious Areas² (acres)
Affordable	2.34	0.99	1.35
South	3.70	2.28	1.42
Central	2.33	0.83	1.50
West: WQ Basin Sub-area	68.50	25.96	42.54
West: RV-Sub area	11.07	3.93	7.14
West: Sub-area between Central and West Discharge Points	11.02	0.00	11.02
West: Total	90.59	29.89	60.70
North	3.40	0.71	2.69

Note: 1- Partition of pervious areas into different categories required by the SDHM program is shown in Appendix 3 of Hyromodification Study.

2- Partition of impervious areas into different categories required by the SDHM program is shown in Appendix 3 of Hyromodification Study.

Source: Hunsaker & Associates, 2010.

The Central Discharge Point and South Discharge Point correspond to the discharge of the Central Basin and South Basin respectively (both are Water Quality/Hydromodification basins).

The results of the hydromodification analysis shows a reduction in the flow duration curve for all peak flows in Post-Development Conditions as compared to Pre-Development Conditions for the four discharge points analyzed (Affordable, South, Central, and West). Therefore, the Affordable, South, and Central Water Quality-Hydromodification basins are large enough to attenuate potentially negative erosion impacts of the development occurring upstream of their discharge points (Affordable, South, and Central Discharge Points respectively). Therefore, a less than significant impact is identified.

The North Discharge Point is not susceptible to hydromodification conflict due to the reduction in total contributing area and the reduction of impervious areas as part of the post-development condition.

With implementation of the proposed detention basins as recommended, no increase in erosion or sedimentation rates is anticipated within Agua Hedionda Creek or its tributaries from development of the proposed project. Additionally, Mitigation Measure WQ-2, which requires preparation of a Final Hydromodification Plan, will be implemented. Therefore, hydromodification impacts are considered less than significant.

5.12.3.4 Water Quality

Construction Impacts

The project would require grading of the site and would result in water quality impacts associated with construction such as increased sedimentation or debris. However, with implementation of construction BMPs (as outlined in the SWPPP) during construction, potential impacts to water quality will be reduced to a level less than significant. In addition, all runoff conveyed in the proposed storm drain systems will be treated in compliance with Regional Water Quality Control Board regulations and NPDES General Permit No. CAS000002, "General Permit for Stormwater Discharges Associated with Construction Activity." The Regional General Construction Stormwater Permit must include:

- Notice of Intent (NOI);
- Stormwater Pollution Prevention Plans; and,
- Monitoring Program and Reporting Requirements.

In addition, RWQCB Order No. R9-2007-0001 (NPDES Permit No. CAS0108758), sets waste discharge requirements for discharges of urban runoff from municipal storm separate drainage systems draining the watersheds of San Diego County. Post-Construction BMPs shall include source-control, site design, and treatment control BMPs.

Operational Impacts

CCRC Site

Once constructed, the project site will likely generate certain pollutants commonly found in similar developments that could affect water quality downstream from the project site. Pollutants are generated from residential developments, streets, and parking lots. Those pollutants include sediment discharge, nutrients from fertilizers and eroded soils, trash and debris, oxygen demanding substances, heavy metals, oil and grease from paved areas, bacteria and viruses, and pesticides from landscaping and home use. To address this, the Dos Colinas project includes detention basins located throughout the project site, as well as structural treatment control BMPs, to treat post-construction stormwater runoff. Figure 5.12-7 depicts the proposed Storm Water Management Plan and BMP locations.

Runoff from the developed project site drains to the same five points of discharge. All flows from the project site ultimately confluence within Agua Hedionda Creek. Water quality of Agua Hedionda Creek is anticipated to be impacted by construction and post-construction activities. Therefore, a significant water quality impact is anticipated with development of the project. To provide maximum water quality treatment for flows generated by the proposed development, a BMP "treatment train" is proposed to be employed within the CCRC portion of the Dos Colinas project site:

- Developed site flows will received primary treatment via Low Impact Development Techniques;
- 85th percentile flows will then drain to the adjacent curb and gutter; and,

SITE DESIGN BMPs & LOW IMPACT DESIGN:

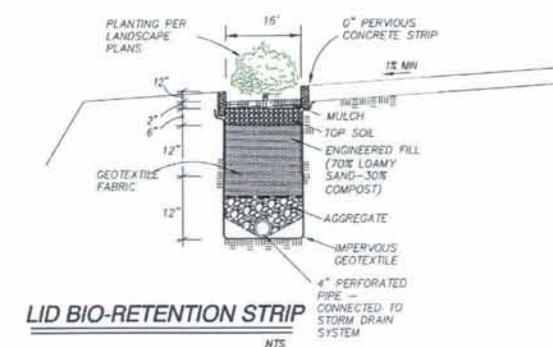
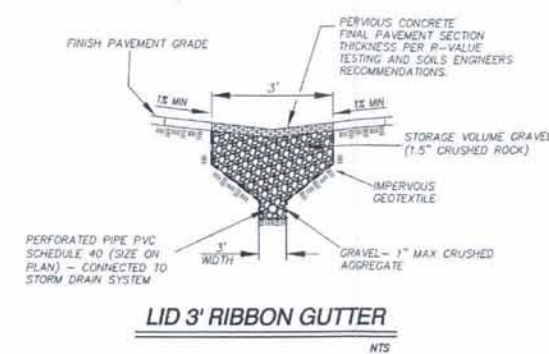
- MINIMIZE IMPERVIOUS FOOTPRINT
 - CONSTRUCTING STREETS, SIDEWALKS, AND PARKING LOTS TO THE MINIMUM WIDTHS NECESSARY TO COMPLY WITH CITY OF CARLSBAD REQUIREMENTS WITHOUT COMPROMISING PUBLIC SAFETY.
- MINIMIZE DIRECTLY CONNECTED IMPERVIOUS AREAS
 - DRAINING ROOFTOPS AND PARKING AREAS INTO ADJACENT LANDSCAPING PRIOR TO DISCHARGING TO THE STORM DRAIN.
- SLOPE & CHANNEL PROTECTION / HILLSIDE LANDSCAPING
 - STABILIZE PERMANENT CHANNEL CROSSINGS.
 - PLANTING NATIVE OR DROUGHT TOLERANT VEGETATION ON SLOPES.
 - ENERGY DISSIPATORS, SUCH AS RIPRAP, AT THE OUTLETS OF NEW STORM DRAINS, CULVERTS, CONDUITS, OR CHANNELS THAT ENTER UNLINED CHANNELS.

TREATMENT CONTROL BMPs:

- EXTENDED DETENTION BASIN (TC-32) TARGETING COARSE SEDIMENTS & TRASH, POLLUTANTS THAT TEND TO ASSOCIATE WITH FINE PARTICLES DURING TREATMENT
- BIO-RETENTION (TC-32) TARGETING NUTRIENTS, COARSE SEDIMENTS & TRASH, POLLUTANTS THAT TEND TO ASSOCIATE WITH FINE PARTICLES DURING TREATMENT

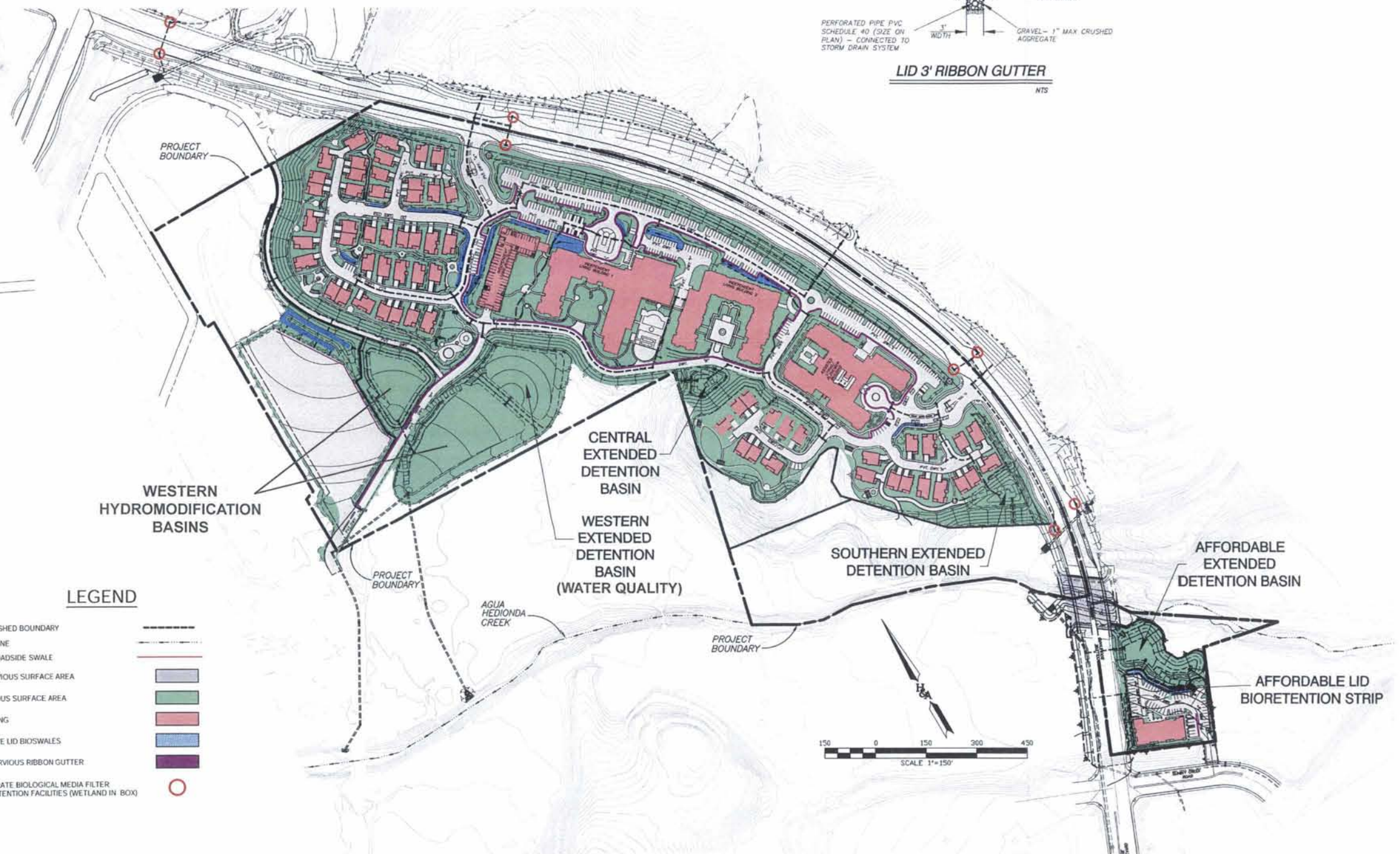
SOURCE CONTROL BMPs:

- LANDSCAPING
 - MANUFACTURED SLOPES SHALL BE LANDSCAPED WITH SUITABLE GROUND COVER OR INSTALLED WITH AN EROSION CONTROL SYSTEM.
- URBAN HOUSEKEEPING
 - LANDSCAPERS SHOULD BE EDUCATED AS TO THE PROPER USE, STORAGE, AND DISPOSAL OF THESE POTENTIAL STORMWATER CONTAMINANTS
- TRASH STORAGE AREAS
 - ALL TRASH ENCLOSURES WILL BE PAVED WITH AN IMPERVIOUS SURFACE, DESIGNED NOT TO ALLOW RUN-ON FROM ADJOINING AREAS, SCREENED OR WALLED TO PREVENT OFF-SITE TRANSPORT OF TRASH. PROVIDE ATTACHED LIDS ON ALL TRASH CONTAINERS THAT EXCLUDE RAIN, ROOF OR AWNING TO MINIMIZE DIRECT PRECIPITATION.
- INTEGRATED PEST MANAGEMENT
 - KEEPING PESTS OUT OF BUILDINGS AND LANDSCAPING USING BARRIERS, SCREENS AND CAULKING. PHYSICAL PEST ELIMINATION TECHNIQUES SUCH AS WEEDING, SQUASHING, TRAPPING, WASHING OR PRUNING OUT PESTS. RELY ON NATURAL ENEMIES TO EAT PESTS.
- STORM WATER SYSTEMS STENCILING AND SIGNAGE
- EFFICIENT IRRIGATION PRACTICES
 - ALL LANDSCAPED AREAS WILL INCLUDE RAIN SHUTOFF DEVICES TO PREVENT IRRIGATION DURING AND AFTER PRECIPITATION. FLOW REDUCERS AND SHUTOFF VALVES TRIGGERED BY PRESSURE DROP WILL BE USED TO CONTROL WATER LOSS FROM BROKEN SPRINKLER HEADS OR LINES.



LEGEND

- WATERSHED BOUNDARY
- FLOWLINE
- VEG. ROADSIDE SWALE
- IMPERVIOUS SURFACE AREA
- PERVIOUS SURFACE AREA
- BUILDING
- PASSIVE LID BIOSWALES
- LID PERVIOUS RIBBON GUTTER
- HIGH RATE BIOLOGICAL MEDIA FILTER BIORETENTION FACILITIES (WETLAND IN BOX)



SOURCE: Hunsaker & Associates, Inc., 2010

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Dos Colinas EIR

Stormwater Management BMP Locations

**FIGURE
5.12-7**

- After collected, flows will be discharged to downstream Extended Detention Basins prior to discharging from the project site.

There are two sub-areas belonging to the contributing areas of the West Discharge Point that are different from the water quality point of view and that will have a different treatment. These are described below.

The first sub-area corresponds to contributing areas belonging to College Boulevard (public areas) that will drain first to six proposed LID high rate biological media filters- bio-retention facilities (treewell in a box type of solution). From there, the runoff will be conveyed into the West Water Quality Basin as the rest of the contributing area to the West Discharge Point in Dos Colinas.

The second is a sub-area named RV drainage area which cannot drain to the West Water Quality Basin due to topographic constraints. This area will drain into a flow based vegetated filtration swale that will discharge into the Hydromodification West Basin, at the portion of such basin located north of the emergency access road.

Affordable Housing Site

To provide maximum water quality treatment for flows generated by the proposed affordable housing development, a Low Impact Development (LID) bio-retention based BMP is to be employed within the site. Flows generated via the proposed structure and parking lots will drain to a LID bio-retention strip. This filter strips intercepts 85th percentile treatment volume, draining to a sub-base consisting of a layer of engineered fill, ultimately draining to an underlying sub-drain.

Agua Hedionda Creek and Agua Hedionda Lagoon will receive stormwater runoff from the project site. Because grading activities have the potential to increase the level of sedimentation/siltation that enters Agua Hedionda Lagoon, the impact is considered significant.

Conclusion

The proposed project will comply with all requirements of the San Diego MS4 Permit per SWRCB Order No. R9-2007-0001 (NPDES Permit No. CAS0108758), Order 2009-0009-DWQ (General Construction Permit CAS000002), and any other applicable NPDES permits. In accordance with such permits, a SWPPP and a Monitoring Program Plan will be developed prior to issuance of grading permits, and a complete and accurate NOI shall be filed with the SWRCB, meeting all regulatory standards. Additionally, Mitigation Measure WQ-1, which requires preparation of a SWPPP, and Mitigation Measure WQ-3, which includes site design BMPs, will be implemented. Therefore, impacts to water quality would be considered less than significant.

5.12.3.5 100-Year Flood Hazards

Historically, flooding has occasionally occurred on the project site and portions of the project site are located within a 100-year flood hazard area. Specifically, the northwestern portion of the CCRC site (including the majority of the RV storage and garden area and the western detention basins), the southern portion of the CCRC site, as well as the entire affordable housing site are located within the 100-year

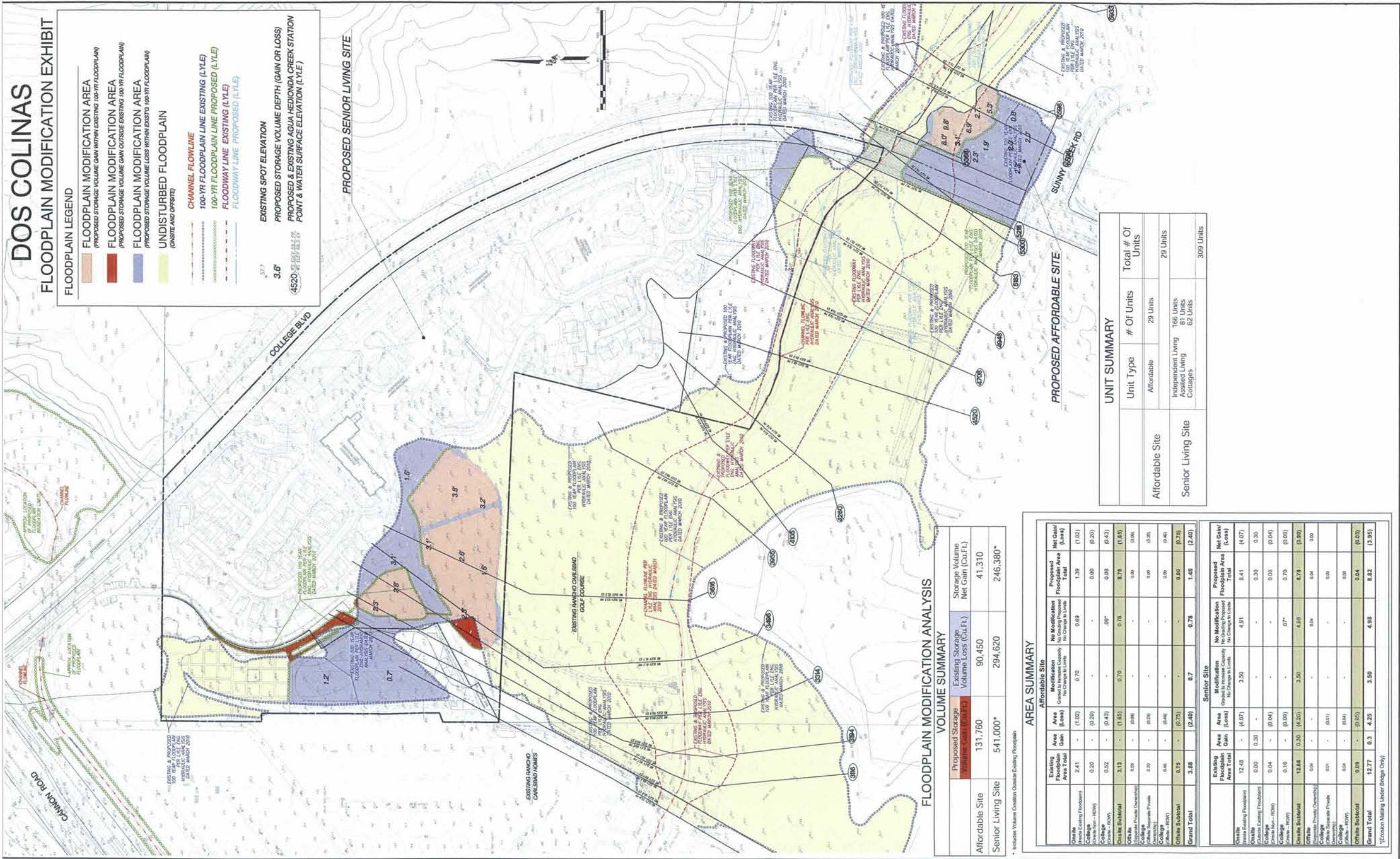
floodplain. The proposed project would place housing within a 100-year flood hazard area and structures that would impede flood flows. However, the portions of the development in the 100-year floodplain would be raised above the floodplain and floodwaters would be directed and channelized through appropriate storm drain facilities and detention basins. Portions of the CCRC Site within the 100-year floodplain will be graded below existing grades. The grading would provide the floodplain fills to elevate portions of the development above the 100-year floodplain and create basins (West Hydromodification Basin and West Water Quality Basin), in which floodwaters could be collected and discharged. Grading would occur similarly on the Affordable Housing Site to elevate the building pad above the 100-year floodplain. Approximately 26,800 cubic yards of fill will be imported to raise the Affordable Housing Site approximately 10 feet, from its existing ground elevation of approximately 73.2 feet to a pad elevation of 83.9 feet. Figure 5.12-8 depicts the floodplain modification. Floodplain modifications will require updates to the FEMA FIRM maps, which will be processed through a Conditional Letter of Map Revision (CLOMR) during the final design stage of the proposed project. Figure 5.12-9 depicts the proposed 100-year floodplain.

Detention Basin BJ is anticipated to provide additional flood protection to Rancho Carlsbad Estates. The natural flow will be directed through Basin BJ and will flow under College Boulevard and join an earthen channel adjacent to Rancho Carlsbad Estates, which flows under El Camino Real in a westerly direction to Agua Hedionda Lagoon.

Implementation of the proposed grading and drainage improvements will remove the portions of the project site containing structures from the 100-year floodplain. Additionally, implementation of Basin BJ, as well as the proposed Hydromodification Basins and Water Quality Basins, would assist with flood control. Therefore, this issue is considered less than significant.

The proposed project improvements will increase flow conveyance volume in the floodplain fringe areas east and west of College Boulevard. The hydraulic analyses concluded that the 100-year water surface elevation and velocities west of proposed College Boulevard extension will not be significantly impacted by the proposed grading improvements. However, east of College Boulevard an increase in 100-year water surface elevations is anticipated upstream of the proposed bridge for the future College Boulevard crossing of Agua Hedionda Creek. This increase in water surface elevations is specifically restricted to the Affordable Housing project site limits. However, no habitable structures will be impacted. The portion of the proposed Affordable Housing project site that is proposed for the affordable housing building will be graded to at least one foot above the increased 100-year water surface elevations. The existing adjacent property lies at least 2 feet above the proposed 100-year water surface elevations. Although the water surface elevations would increase within the affordable housing project site, there would be a decrease in 100-year velocities upstream of College Boulevard due to the proposed College Boulevard bridge, which would create a backwater and slow down approaching floodwaters from the east along Agua Hedionda Creek.

As described above, the portions of the development within the 100-year floodplain would be raised above the floodplain and floodwaters would be directed and channelized through appropriate storm



SOURCE: Hunsaker & Associates, 2010

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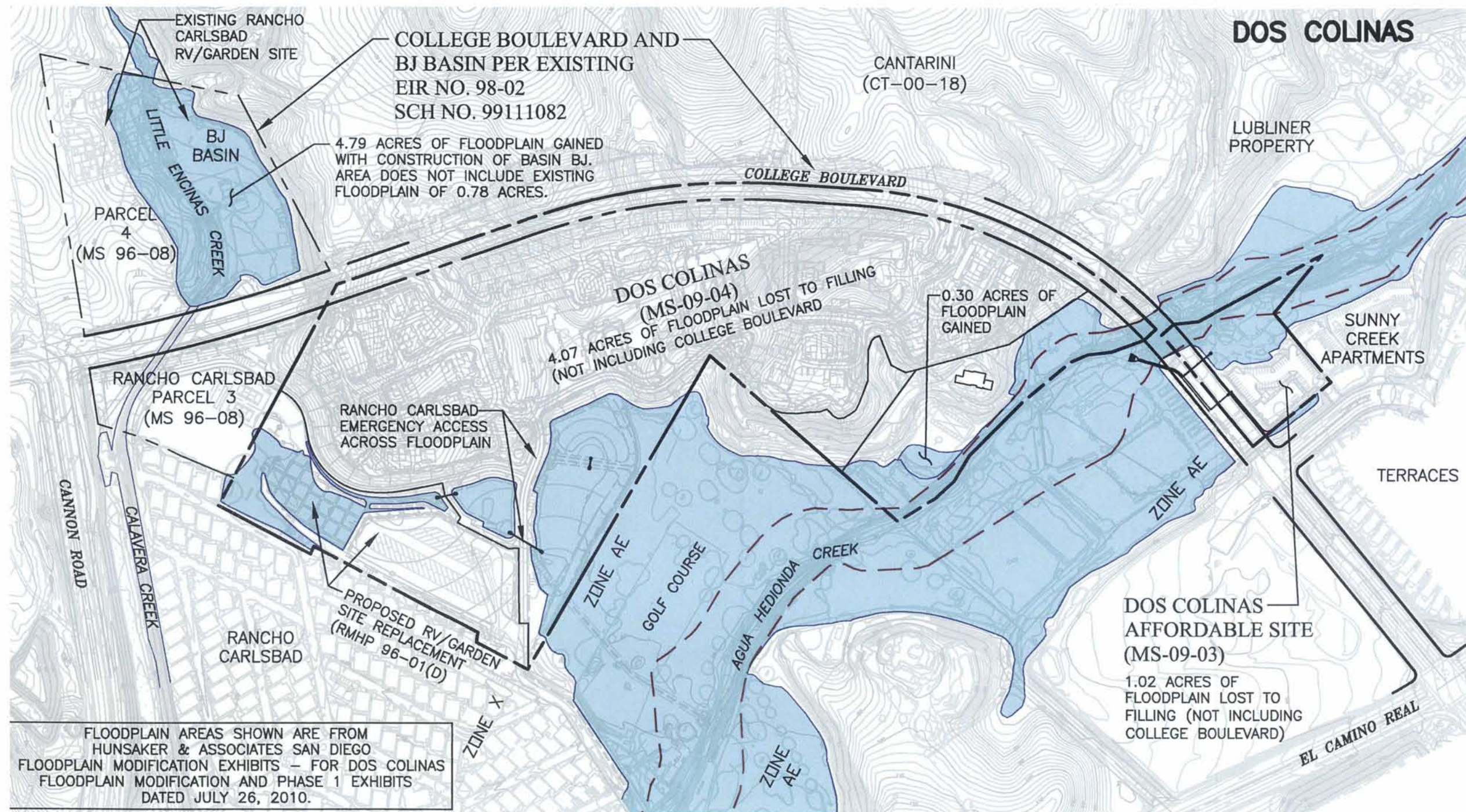


Flood Plain Modification

Dos Colinas EIR

FIGURE

5.12-8



SOURCE: Ladwig Design Group, Inc., 2010



Dos Colinas EIR

Proposed 100-Year Floodplain

FIGURE
5.12-9

drain facilities and detention basins. Therefore, 100-year flood hazard impacts are considered less than significant.

5.12.4 Mitigation Measures

WQ-1 Prior to issuance of a grading permit for any phase of the development, the applicant shall prepare and submit for review and approval of the Carlsbad City Engineer, a Storm Water Pollution Prevention Program (SWPPP) to demonstrate that pollutants will be controlled through compliance with the City of Carlsbad Standard Urban Stormwater Mitigation Plan (SUSMP), General Construction Stormwater Permit (Order No. 2009-0009-DWR, NPDES CAS000002), and the General Municipal Stormwater Permit (Order No. R9-2007-0001, NPDES CAS0108758). The applicant shall be responsible for monitoring and maintaining the BMP erosion control measures identified below on a weekly basis in accordance with the City's grading and erosion control requirements (Municipal Code Section 15.16. et seq.). The locations of all erosion control devices shall be noted on the grading plans. BMPs that shall be installed include, but are not limited to, the following:

- Silt fence, fiber rolls, or gravel bag berms;
- Check dams;
- Street sweeping and vacuuming;
- Storm drain inlet protection;
- Stabilized construction entrance/exit;
- Hydroseed, soil binders, or straw mulch;
- Containment of material delivery and storage areas;
- Stockpile management;
- Spill prevention and control;
- Waste management for solid, liquid, hazardous, and sanitary waste-contaminated soil; and,
- Concrete waste management.

WQ-2 Prior to the issuance of a grading permit for any phase of development, the applicant shall prepare a Final Hydromodification Plan in accordance with the Final Hydromodification Management Plan. The final plan shall show how the project complies with the applicable hydromodification provisions of Order R9-2007-0001 and is designed so that post-project runoff flow rates and directions do not exceed pre-project runoff flow rates and directions for applicable design storms.

WQ-3 Prior to the issuance of grading permits or other approvals for any public or private right-of-way improvements or site development plans, the developer shall prepare and submit for review and approval of the Carlsbad City Engineer, improvement plans that demonstrate that pollutants will be controlled through compliance with the City of Carlsbad SUSMP and Stormwater Management

Program (SWMP). Approval of such plans shall be subject to a determination by the Carlsbad City Engineer that the proposed project has incorporated the post-development water quality pollution control site design BMPs, source control BMPs, and structural treatment control BMPs identified below into the project design to the maximum extent practicable:

- Street sweeping;
- Inlet basin labeling;
- Filtering bioretention units;
- Pervious pavement;
- Vegetated swales;
- Detention/infiltration basins; and,
- Covered trash enclosures.

5.12.5 Impact After Mitigation

Implementation of Mitigation Measures WQ-1 through WQ-3 will reduce the erosion, siltation, hydromodification, and water quality impacts to less-than-significant levels.